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Anti Microbial And Percutaneous Catheter Drainage Treatment: A Boon To Liver Abscess Patients

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Abstract: *For every disease condition, prevention is better than cure is the good choice. By properly having self-hygienic and good sanitation measures can solve many problems and the liver abscess is one of the condition falls under this category. Although the symptoms are quite normal like fever, abdominal pain, jaundice etc., these only leads to the worsening of the situation and improper diagnosing and the inappropriate treatment may cause worsening of situation, sometimes it may be fatal too. In our study we considered 11 male patients who are completely alcoholics and 8 of them are smokers, presented with fever, jaundice, abdominal pain, hepatomegaly, tenderness and other comorbid conditions. The mid-summers and alcohol consumption are found to be one of the leading cause for this situation. The clinical findings reported the raised liver enzymes (100% OF SGOT, 63.6%SERUM BILIRUBN, 54% SGPT) and WBC and dropped hemoglobin levels. The radiographic studies further helped to diagnose the condition of patients with clearly providing reports on number of liver lobes and abscess size involved i.e., 5 -12 cm. Based on all these the treatment is provided which included the antibiotic and catheter drainage techniques. Through our study we concluded that percutaneous catheter drainage and anti-microbial are very effective in patients having abscess size more than 5 cm. along with proper hygienic conditions and sanitation measures.*

Keywords: *liver abscess*, percutaneous catheter drainage techniques*, antimicrobial therapy*, alcohol consumption, hepatic enzymes, comorbid situations.*

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I. Introduction

Pyogenic liver abscess (PLA) may be defined as solitary or multiple collections of pus within the liver, the result of bacterial infection. It is a burning problem of tropical countries which cause significant morbidity, mortality and remains a formidable diagnostic and therapeutic problem.The most common presenting clinical symptoms include upper abdominal pain, high grade fever, and loss of appetite. These clinical features are variable depending on size of abscess, general health of patients, associated diseases and other complications. The most common sign is right hypochondrial tenderness. Some patients may present with jaundice, pleural effusion**[9].**

Majority of abscesses are multiple which are due to portal entry from biliary tract and arterial circulation and sub diaphragmatic and are noted in the right lobe of the liver. Solitary or single abscess is due to portal circulation, cryptogenic and trauma **[9].**

The management of pyogenic liver abscesses is changing depending on the cause and local expertise. A varying proportion of patients are treated with antibiotics alone, surgical therapy or radiological interventions, or a combination of both. However, there appears to be an overall trend for antibiotics and radiological intervention (either drainage or aspiration) to be the initial treatment of choice **[23].** Intravenous use of antibiotics is considered as one of the most critical measure for treatment of pyogenic liver abscess. Use of antibiotics is mostly effective in controlling symptoms of patients with small liver abscess. However, for large liver abscess, single use of antibiotics is insufficient due to higher bacterial load, inadequate penetration of antibiotics and ineffective medium for bacterial elimination. Effective drainage is recognized as the most effective treatment for large liver abscess, since it could definitely lower bacterial load and increase antibiotics penetration in to the abscess. **[24]**

II. Methodology

This is a prospective observational study conducted at general medicine department in government general hospital, Kakinada which is a tertiary center of 1100 beds. This study involved all PLA adult patients of age group 20-80 years. A total of 11 patients with pyogenic liver abscess were taken from February 2018 to

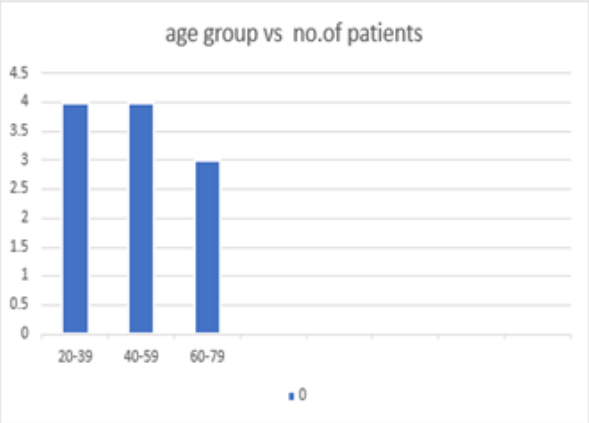
October 2018. All the patients were sent to the radiology department for confirmation of diagnosis on ultrasound. Other investigations included are complete blood count, liver function tests, abscess characteristics (number, size, location of abscess), clinical features, and co-existing medical conditions. Patients' demographics are also included. In our study patients with abscesses larger than 5cm sizes (5-12cm) were taken which are to be managed by ultrasound guided percutaneous drainage. The initial treatment include antibiotics like metronidazole, ceftriaxone followed by drainage technique. The patients were examined daily for clinical improvement. Improvement in pain, fever, anorexia were observed and follow up imaging with USG was performed every 30 days till the abscess resolved.

III. Results

Total of 11 patients of pyogenic liver abscess cases were taken during the time period of 9 months i.e., from February to October.

a) ***Incidence of age of the subjects:***

We considered the age groups from early 20's to late 80's (20 – 80). Most of the cases noted in between the age groups 20 – 59 i.e., 72% of incidence and 27.2% of incidence observed in the age group from 60 – 79. Youngest case of 23 years was noticed.



b) *Duration – seasons affecting the patients:*

We considered 9 months of time period from February to October and seasons included summer, rainy and winter. Most of the cases noticed during mid-summer in the month of May and 44.4% was observed. In summer the highest cases were of 90.9% and noticed and in winter no case was recorded.

Season	No. of subjects	% of cases
Summer	10	90.9%
Rainy	1	9.09%
Winter	0	0

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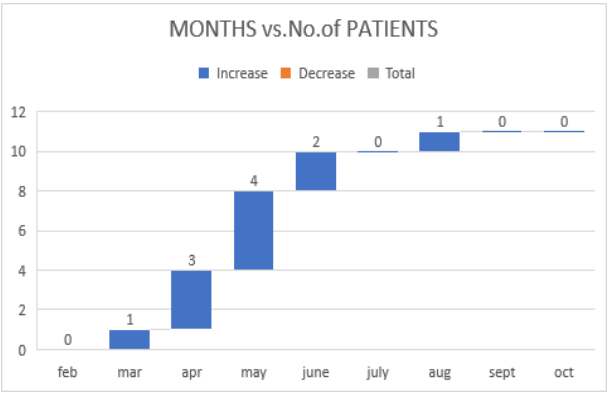
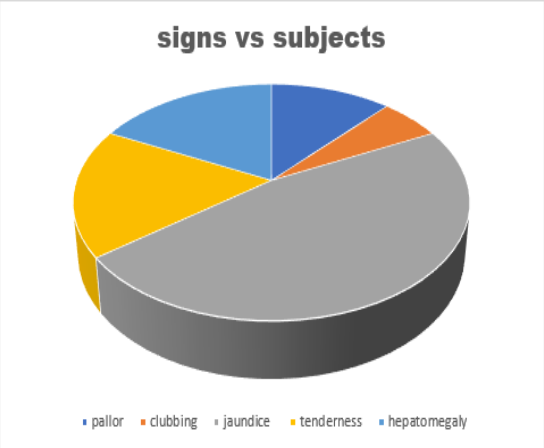


c) *Signs of the patients:*

For liver abscess some important signs were observed. General signs included were pallor, clubbing, jaundice, abdominal tenderness, and hepatomegaly. Majority of the patients reported jaundice of 72%, tenderness of 45%. Among these subjects, all the signs except pallor/clubbing were reported by only 1 (20%).

Signs of the case	No.of subjects	% of subjects
Pallor	2	18%
Clubbing	1	9.09%
Jaundice	8	72%
Tenderness	5	45.4%
Hepatomegaly	3	27.2%



d) *Symptoms of the subjects:*

Some of the common symptoms reported by the subjects were fever with chills, abdominal pain, anorexia, edematous condition. Though, these were common symptoms in every case, but were considered as important in this liver abscess as these might worsen the situation. Most of them reported fever along with abdominal pain especially at right hypochondriac region and right upper region of abdomen of 90.9% i.e., out of 11 subjects 10 were reported this. Followed by anorexia condition reported in 4 subjects 36.3% and 3 subjects reported edema and fever with chills 27.2%. 2 subjects reported breathlessness and vomiting 18.1%.

Symptoms	No. of subjects	% of the subjects
Fever	10	90.9%
Fever with chills	3	27.2%
vomiting	2	18.1%
anorexia	4	36.3%
Breathlessness	2	18.1%
Abdominal pain	10	90.9%
Edema	3	27.2%

e) *Comorbidities condition:*

Other than the liver abscess, the subjects were also having the other disease conditions but only few i.e., out of 11, 6 were diagnosed. The conditions were hypertension, chronic renal disease, immune compromised, sepsis, renal calculi.

Comorbidity	No. of subjects	% of subjects
Hypertension	2	33.3%
Chronic kidney disease	1	16.6%
Immune compromised	1	16.6%
Sepsis	1	16.6%
Renal calculi	1	16.6%

f) *Social history of the subjects:*

Social history includes their habits, occupation details .etc. which are clinically significant for the subject's condition. In liver abscess, one's social history plays important role as alcohol consumption is one of the major cause for this case. In this case, we have considered subjects having history of both alcoholism and smoking tobacco.

Subject's habit	No. Of subjects	% of subjects
Alcoholic	11	100%
Smoker	9	81%

g) Clinical and serological investigations:

Serological investigations include blood tests like HBs antigen testing, immune assays. In these subjects we considered the HBs antigen testing for all the subjects and found negative for that test. Chest X-ray was also done to subjects. Clinical lab investigations included hemoglobin levels, total W.B.C count, platelet levels, liver enzyme tests, serum creatinine levels, blood urea levels.

Blood level values:

Lab findings	No. of subjects	% of subjects
Decreased hemoglobin	6	54%
Raised WBC	4	36%

Liver enzyme test values:

Lab findings	No. Of subjects	% of subjects
Elevated alkaline phosphatase (ALP)	4	36%
Elevated SGOT	11	100%
Elevated SGPT	6	54%
Elevated serum bilirubin	7	63.6%

*SGOT- serum glutamic oxaloacetic transaminase. *SGPT- serum glutamic pyruvic transaminase.

Radiological findings:

The patients were supposed to perform sonography of abdomen to clearly know the condition. To know the abscess size, location as this gives proper information regarding the patient's condition. And the results reported were 1(9.09%) reported solitary locule and remaining 10(90.9%) reported multilocular. And 3(27.2%) out of 11 patients were partially liquefied and remaining 8(72.7%) were completely liquefied. The

liver lobes affected with liver abscess, both lobes only 1 person reported that and others reported only right lobe. The size of the abscess is above 5 cm and below 12 cm. The mean size of the patients observed was 8.1 cm.

IV. Discussion

Liver abscess is one of the major life threatening conditions. Though, it develops slowly with fever, abdominal pain, and icterus, if not treated properly leads to death. The serious and severe condition may be caused by improper self-health care, not seeking proper supportive care, not following physician's instructions, poor sanitation conditions.

In our study, the mean age group patients with liver abscess were in fourth and fifth decades and the incidence was 72% and 27.2% respectively. In a study the author also clearly mentioned that middle aged people were more affected [9]. ***Malik AA et al*** presented study on 169 patients, in whom average age was 42 years, 102 were females and 67 males [4].***Ochsner et al*** stated that the greatest age incidence is from the third to the fifth decades [1, 8]. ***Heneghan et al*** presented study on 11 patients with a mean age of 60.27 years 6 males and 5 females, and showed the majority of patients were in their fourth decade with male dominance [5]. The sex incidence of pyogenic hepatic abscess reveals a preponderance of occurrence in the male, 67.4 per cent in the collected series and 96%of males according to the authors [1, 2, 3, 8] but in our study we found 100% of males' incidence. The reason thought to be the social habits like alcohol and seasons might have some influence as during mid-summer highest number of cases were diagnosed as mentioned in results in table no.2. Mainly, in summer the patients prefer native alcohol (palm wine) and also past history of alcohol consumption might have affected. 100% in complicated patients, probably because of the greater exposure of males to contaminated food and water due to their active life and an increased incidence of alcohol consumption among them according to one author [2].

The clinical manifestations we found in our patients were pallor, clubbing, jaundice, hepatomegaly, tenderness, and highly reported signs were jaundice, hepatomegaly and tenderness. The symptoms which were responsible for the patients to be joined in hospital were abdominal pain, fever, anorexia and other reported were nausea, vomiting, breathlessness conditions. Some authors also mentioned these clinical presentations in their studies [1, 2, 6]. In ***Ka-Ho Lok et al*** study, fever and chills (91%), anorexia (16.2%), jaundice (13.5%), hepatomegaly (6.3%)[7]. These clinical manifestations were necessary to evaluate the liver abscess and required treatment was provided accordingly. The comorbidities also influence the patient's condition. In our study we found the comorbidities like hypertension of 33.3%, pleural effusion, kidney disease, sepsis, immunocompromised of 16.6%. ***Sathish Christopher et al*** stated that comorbidities have also influence on the liver abscess outcome and major comorbidity associated with liver disease was diabetes found in 6 patients followed by hypertension, ischemic heart disease, renal failure and cerebrovascular damage [8]. The baseline comorbidities of diabetes mellitus, polycystic kidney disease, malignancy, chronic liver disease, biliary tract disease, or alcoholism predicted development of liver abscess. Renal disease is also a strong risk factor of liver abscess [10]. Patients with diabetes mellitus, immune deficiency, sickle cell anemia, malignancy, and liver transplants are at a greater risk for developing liver abscess [11, 12].

Mainly for analyzing and diagnosing the condition along with the signs and symptoms the laboratory indicators help to understand and analyze properly. So, for the liver abscess to be diagnosed the important indicators to be considered were hepatic enzyme values, complete blood count values, immunological assays, microbial cultures. But for our study we have collected LFT values, bacterial culture reports which showed all negative result for bacterial cultures and blood cell levels. Unlike other studies we found that 100% elevation in SGOT values, 63.6% raise in serum bilirubin, 54% raise in SGPT and 36% of ALP value, decreased hemoglobin levels and raised WBC count. According to ***B W Miedema et al*** the SGOT values is significantly higher in non survivors ($p<0.05$) and raised WBC values with an average of 16.2k/ml and decrease in values of hemoglobin and globulin are significantly lower in non survivors ($p<0.05$) [13]. Results revealed that the levels of alkaline phosphatase was raised in 59 patients was stated in one study [8]. In one author's study there was an increased ALP in 80 patients (72.1%), and elevated ALT in 65 patients (58.6%) [7].***Maheshwari T et al*** stated in their study shows about 45.63% patients had hemoglobin<10 gms/dl, polymorphonuclear leukocytosis in 139 patients, raised SGPT in 136 patients and SGOT in 133 patients and enzymes (raised alkaline phosphatase in 17 patients[6] . In ***Christopher S et al*** study also they found elevated SGOT, SGPT and ALP values like in our study [8] .

Now one of the main indicators radiographic findings, ultrasound abdomen and the results were framed by considering the no.of locules, lobes involved, and the size of abscess considered. As ultrasound help easy and proper identification of abscess and to perform the surgical techniques. ***Maheshwari T et al*** said that Ultrasonography is the preferred initial tool for the diagnosis of liver abscess with a sensitivity of 85% to 95%. Ultrasound can identify lesions more than 2 cm in diameter [6] .Present study said that 90.9% of multilocular and 9.09% solitary were noticed. And out of 11 patients 3(27.2%) were partially liquefied and remaining 8 (72.7%) were completely liquefied and the size considered was >5cm and all of the patients were more than 5 cm and

less than 12 cm were recorded. In most of them right lobe was involved (10/11) and only 1 person have both the lobes i.e.., right and left lobes. According to ***Dhaval et al*** stated that the mean size of liver abscess was 6.87 cm (range 2–15 cm). The majority of patients had solitary liver abscesses (56%). Most of the abscesses occurred in the right lobe (84%). Nine patients (4.5%) had liver abscess in the left hepatic lobe, and 25 patients (12.5%) had bilobar disease [9] .There is a preferential blood supply to the right hepatic lobe through the large right branch of portal vein. This explains the high incidence of the right lobe liver abscess in our study. In ***Lok et al*** study they found the majority of patients had solitary liver abscess (80.2%). Most of the liver abscesses occurred in the right hepatic lobe (n = 75, 67.6%). Thirty patients (27.0%) had liver abscesses in the left hepatic lobe and 6 patients (5.4%) had bilobed liver abscesses [7] . But in our study we found that majority of patients having bi or multi locules and only 1 patient with both lobes were reported. In other studies also they found the majority of abscess in right lobe and most of them were solitary [8] .

Based on the size of abscess, location and considering comorbidities the treatment is recommended in the patients. For liver abscess the treatment generally given are surgery followed by antimicrobial therapy shows good prognosis in the patient's condition. ***Maheshwari T et al*** stated medical treatment alone without any drainage procedure in abscess cavity more than 6 cm has shown poor results in their series [6] .Antimicrobial therapy given parenteral through intravenous route and later given orally. ***Lok et al*** stated in their study that intravenous antibiotics were given to all these patients and this was the only treatment for 22 patients (19.8%)[7] .Surgical drainage techniques involved are percutaneous and open surgery. And percutaneous technique includes needle aspiration and catheter drainage technique. For some authors percutaneous treatment of hepatic abscesses has been praised for its simplicity and excellent results. Although of considerable benefit, percutaneous drainage is not necessarily the best treatment for all patients and is associated with a significantly higher failure rate than surgical drainage. [6, 13, 15-17] . Percutaneous technique is better than open surgical techniques.***Miedema et al.*** stated in their study that some other authors followed only antimicrobial therapy without surgical, and that was risky and all the liver abscess should be drained and optimum treatment should be provided [13] .In present study the patients were performed percutaneous aspirations and antimicrobial treatment. The antimicrobial treatment included the drugs metronidazole, III generation cephalosporin like ceftriaxone, chloroquine, ciprofloxacin, vitamin K. Other drugs used were antihypertensive, tramadol, udiliv [***ursodeoxycholic acid***], sulbacef(cefoperazone+sulbactam) based on their other conditions. And the given treatment was effective in the patients and good response was observed. And the length of hospital stay was for 2 weeks. The drainage technique was performed on the next day of the patient's admission and immediately started antimicrobial therapy. The patients who received first the catheter drainage and later antimicrobial have developed good improvement in their condition. Although weakness and anorexia continued in some due to hospital environment still developed good improvement. After getting discharged also the patients follow up was done and they have not developed any adverse reactions to the treatment. ***Yu-Long Cai et al.*** a larger abscess cavity produces a larger quantity of pus, which needs to be drained continuously and is not suitable for PNA [19]. .The preferred catheter drainage technique really helped the patients to recover quickly as the liquefied material was removed the disease progression was controlled i.e., further spreading of the disease was reduced and usage of antibiotics supported them. Percutaneous catheter drainage has the obvious advantage of providing continuous catheterization by the placement of an indwelling drainage catheter. Because of this, pus can be evacuated more frequently and the abscess cavity shows a faster rate of collapse during the initial period in patients treated with PCD [19] .***Razak et al.*** showed a significantly higher success rate in the catheter drainage group [9, 18]. No fatal condition was noticed. Even though some developed slow response due to the comorbid conditions and also received proper treatment for those conditions also. Out of 11 patients, catheter drainage technique performed for only one time in 9 patients successfully, but in 2 patients it was twice due to large abscess size and were clinically good, no complications were noticed like that in one of the author`s study[14] . When compared to ***Herbert DA et al.*** study that without surgical treatment, good response was noticed [20] . We do support this, but this happens only when the abscess size was small. Through our study we found that both surgical and antimicrobial help for fast and effective recovery present days. ***Attar .B et al*** stated review of the literature and their experience with 11 patients suggest that because of the high recovery rate and few complications percutaneous aspiration and drainage should be the first line of treatment in the management of pyogenic liver abscesses [21, 22].

So, finally we concluded that for seasons and locality of people living also influence the health condition and for liver abscess the treatment depends on the size of the abscess, and location of abscess. Along with self-hygienic conditions and strictly following medications can help the patients to recover and prevent worsening of the patient's condition. Current days there are many new techniques for the treatment of liver abscess condition. Catheter drainage technique followed by antimicrobial therapy gives better results.

V. Conclusion

The main reasons for liver abscess are alcohol consumption, improper sanitation. Seasons also show their impact on the disease progression. Self-hygiene, cessation of alcohol consumption are the best precautions for liver abscess condition. Along with the self-care, supportive care and antimicrobial and surgery provides fast and good recovery for the patient. Based on the age group, liver abscess characteristics and other comorbidities the treatment should be provided. In our study no fatal conditions are reported and fast recovery is noticed. So, the antibiotic and catheter drainage techniques are very effective in patients having abscess size more than 5 cm.

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